REPORTS

ARCHAIC PERIOD CANOE FROM NEWNANS LAKE, FLORIDA

Ryan J. Wheeler, James J. Miller, Ray M. McGee, Donna Ruhl, Brenda Swann, and Melissa Memory

Low lake levels, due to drought in spring and summer 2000, revealed the decayed remnants of over 100 dugout canoes buried in the sediments of Newnans Lake near Gainesville, Florida. Radiocarbon assays revealed that 41 of 55 canoes studied were from the Late Archaic period, dating between 2300 and 5000 B.P. Analysis of canoe form and comparison to the small number of other known Florida Archaic period canoes correct previous ideas about early canoes. Patterns of wood choice and manufacturing techniques known from younger canoes were in place during the Late Archaic. The Archaic period canoes from Newnans Lake are indistinguishable from canoes produced in later periods and are not the crude, short, blunt-ended type thought to represent the earliest dugout canoes. Thwarts or low partitions on almost half of the Archaic canoes studied confirm a long temporal span to the canoe-making tradition of peninsular Florida. Middle and Late Archaic groups had boat-building and related technologies in place 7,000 years ago and were expanding into areas with newly emerging freshwater resources created by higher water tables.

Drought, leading to low water levels, often has revealed canoes in Florida lakes, rivers, and peat bogs (Purdy 1978; Willis 1979). These canoes are often of precontact Native American design, though European- and American-period log boats also are found (Newsom and Purdy 1990; also see Purdy 1991). Such was the case in the spring and summer of 2000, when rainfall deficits across northern Florida averaged 60 cm (24 inches). The dried-up bed of Newnans Lake, 8 km east of Gainesville in Alachua County, revealed the decayed remnants of over 100 of these log boats. The Florida Bureau of Archaeological Research used this opportunity to conduct a detailed study of 55 of the canoes—41 of which dated between 2300 and 5000 B.P. Prior to this discovery, few canoes dated to the Archaic were known from Florida and the Southeast (Hartmann 1996:81).

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Environmental Setting

Newnans Lake is a broad, shallow, eutrophic lake, with a maximum depth of 4 m and a mean depth of 1.5 m. With an area of 2,976 ha, Newnans Lake is one of the largest surface-water features in the Orange Creek drainage basin (Gottgens and Montague 1987:4, 7). This drainage basin, located in portions of Alachua, Clay, and Marion counties, is at the northern end of an extensive lake district that extends over 325 km through the Florida peninsula (Brenner et al. 1990:366). Most of the canoes recorded in Florida have come from this district. Prior to the construction of water-control features in 1967, Newnans Lake had fluctuating seasonal water levels that, along with relatively steep sides, probably helped in the development of the cypress swamp forest that dominates the lake margins (Gottgens and Montague 1987:11, 21).

Archaeological Background

Forty-four sites are recorded in the vicinity of Newnans Lake, primarily on the southwestern side of the lake (Figure 1). Many of these are directly on the lakeshore, though others are located on upland areas near smaller ponds and marshes. Of these 44 sites, 16 have Archaic period components. The Archaic sites can be further classified as those with lithics and stemmed points, typically associated with the Middle through Late Archaic (6000–4000 B.P.) (n = 10), and those that have fiber-tempered ceramics indicative of the Late Archaic Orange period (4000–2500 B.P.) (n = 6) (see Milanich 1994:75–95). Thirteen of the Archaic sites are on the southwestern end of the lake and three are on the northern side of the lake near the area where the canoes were found. Informants report finding Archaic period artifacts on a sandy berm within the cypress swamp that rings the lake’s northeastern margin. Recent testing by co-author McGee on this berm identified extensive lithic sites dating from the Early through Late Archaic.

The most well known pre-pottery Archaic site in the Newnans Lake vicinity is 8AL356. Clausen (1964:8–12) used data from this site to describe several styles of Florida Archaic lithic stemmed points or bifaces, including the Newnan’s Lake point. Interestingly, Clausen (1964:20–21, 38–39) concluded, from the distribution of stemmed points and related artifacts, that there was a relationship between the pre-pottery Archaic culture of the Newnans Lake area and the Mount Taylor culture of the St. Johns River basin to the east. Likewise, the succeeding Archaic culture of the Newnans Lake area is related to the fiber-tempered ceramic-making Orange culture of the St. Johns River basin.

At least six of the Archaic sites in the Newnans Lake vicinity have examples of Orange Plain and Orange Incised pottery—one of the earliest ceramic wares in the Southeast (see Bullen 1972; Sassaman 1993:20–21). Bullen (1958:21–23) excavated two sites on the rim of Paynes Prairie, located southwest of Newnans Lake. Both sites, probably similar to those around Newnans Lake, produced plain and decorated ceramics associated with the Orange period. The sites investigated by Bullen did not have extensive Orange period occupations, but his work demonstrates that this culture is represented in north-central Florida. Connections between the Archaic cultures of the north-central Florida and St. Johns River basin areas are significant, since the latter region has produced the earliest canoes known from North America (Hartmann 1996:85, 90–91; Newsom and Purdy 1990:167).

Discovery of the Canoes

Gainesville-area residents reported finding the remains of dugout canoes and plank-built skiffs in the dried-up lake bed of Newnans Lake early in 2000. Reports to the Florida Bureau of Archaeological Research and Florida Museum of Natural History led archaeologists Barbara A. Purdy and Ray M. McGee to visit the lake in May 2000. While searching for one of the plank-built skiffs they noticed several fragmentary dugout canoes. Every additional search revealed the remains of more canoes, and volunteers helped locate the mostly buried remnants of between 14 and 20 canoes in a few days. Archaeologists from the Florida Bureau of Archaeological Research began recording data on the canoes and developed a plan to document remains of at least 50 of the canoes (see discussion of methodology below).

The site was recorded as the “Lake Pithlachocco Canoe Site” and assigned number 8AL4792 in the Florida Master Site File (Memory, Swann, Ruhl, Stanton, and Mattick 2001). The site was nominated to the National Register of Historic Places (NRHP) following preliminary assessment of the data and listed on the NRHP in March 2001.
Remains of decayed, water-logged canoes were discovered within drought-exposed areas of the lake bed on the northeastern side of the lake, covering a trapezoidal area approximately 2.5 km long and .4 km wide, representing 2.76 km². Systematic methods for locating canoes were not employed during this project. Canoes were discovered during pedestrian survey by searching for small portions of the ends or sides of the log boats that projected slightly from lake-bottom sediments. Weedy vegetation growing on newly exposed lake bed, thick layers of recently accumulated muck, and
portions of the lake bed still covered by water constrained the search. In several cases, additional canoes were discovered during the excavation of canoes found during the pedestrian survey. Canoe locations were recorded using a Trimble Differential Global Positioning System (DGPS). Given the environmental limitations on locating canoes and the discovery of several completely buried canoes, the remnants of many more buried canoes are likely present within the study area and surrounding portions of the lake bed.

Fifty-three canoes were selected for more detailed study between June 1 and July 5, 2000. Lower water levels in May 2001 allowed documentation of two additional canoes farther out in the lake bed. Each canoe to be studied was excavated using trowels and hand tools, photographed, and drawn to scale, including azimuth/orientation. Standardized datasheets were completed for each canoe. In addition, wood samples were taken for radiocarbon dating and wood species identification.

Results

Ninety-five complete and fragmentary canoes were identified in the project area between June 2000 and May 2001, and an additional five or six canoe fragments were found in February 2001 on the southwestern side of the lake. All had been made of fire-hollowed logs, similar to others known from Florida. Thirteen of the canoes dated between 500 and 1300 B.P., representing craft of more recent periods. Forty-one dated between 2300 and 5000 B.P., roughly corresponding to the Middle through Late Archaic period (ca. 2500–6000 B.P.) (Figure 2). These are the subjects of the present study.

Preservation

At the time of discovery there was great local inter-
est in removing some of the canoes for exhibit. Virtually all, however, were fragmentary or in a poor state of preservation (Figure 3). Of the 41 Archaic period canoes only 21 had both ends, 13 had one end and part of the deck, five were end fragments, and two were long sections of deck without either end. Only five canoes were largely intact (75–100 percent present), 29 were described as eroded (50–75 percent of the canoe present), and seven were fragmentary (< 50 percent of the canoe present). In most cases, the ends of the canoes were best preserved, largely because they are thickest and retain the most heartwood. In some cases, however, even the ends were highly degraded. Anatomical
examination of the wood indicated a general loss of cell integrity due to wetting and drying episodes, microbial activity, and likely other natural causes (e.g., worm boring, pedoturbation). The areas most affected by degradation were the gunwales, sides, and deck. Often the sides of the canoes had collapsed inward or outward, making assessment of canoe width and depth difficult. Microscopic examination revealed collapsed cells and other damage, accounting for the soft, spongy quality of the wood. Due to this poor preservation, none of the canoes identified during this study was targeted for removal and conservation.

**Canoe Distribution**

Spatial distribution of the canoes within the study area is shown in Figure 4. There appear to be several clusters of the Archaic period canoes, although the unsystematic means for locating canoes and the small number of canoes representing other time periods probably limit such spatial inferences. In general, the distribution of the canoes appears random, with Archaic period canoes in close proximity to those of other time periods. The distribution of canoes along the shoreline also may be an artifact of the areas that were accessible for study. When the site was revisited in May 2001, canoes were found several hundred meters south of those documented in June and July 2000, suggesting that others may be present throughout much of the lake bed.

In at least three cases, two or more were in close proximity to one another, and in some cases canoes were found on top of each other. For example, canoes 23, 24, and 25 were found in a tight cluster. Canoe 23 was excavated first, and only then were the other two found. Canoe 24 was located perpendicular to 23. Excavation revealed a third canoe, 25, roughly parallel to 23 and lying on top of 24. All three have statistically equivalent dates when plotted at calibrated 2 sigma. Canoes 32 and 72 also were in close association, with one end of Canoe 72 located under the midsection of Canoe 32. Radiocarbon dates for these two canoes overlap when plotted to calibrated 2 sigma. In at least two other cases, fragmentary canoe ends are in close association with largely intact canoes. The random distribution of canoes, coupled with this superimposition, suggests that natural forces (e.g., prevailing winds, sedimentation) were involved in deposition of the canoes. Similar patterns were noted for the large number of more recently deposited cut pine and cypress "deadhead" logs left behind during nineteenth- and early twentieth-century logging operations.

**Depositional Environment**

All of the canoes were encased in the oxidized quartz sands that form the lake bottom in the area studied. The quartz sands in some parts of the study area were covered by more recently deposited gyttja, which was drying and cracking. Davis (1946:148, 151) characterizes this sludge-like material as a "sandy muck," due to a high percentage of ash. The gyttja was 20–25 cm thick in some areas, and covers much of the lake bottom. Holly (1976:13) reports that organic deposits are thicker farther from shore, which was consistent with our observations. The usual profile encountered in excavations was tan to yellow oxidized quartz sand from the surface to the area near the bottom of the canoe, usually 20 to 40 cm below the surface, then changing abruptly to white quartz sand. Oxidized sand with organic banding typically filled the inside of the canoes. The interior of the canoes usually was lined with a 2–3-cm thick root mat. A similar, very fibrous, organic deposit was often present around the sides and under the canoes. This organic deposit often contained wood chips and unmodified radial branch fragments, and in some places was characterized as "muck" or "peat" by excavators.

Holly's (1976; also see Watts 1969) work on the sedimentary history of Newnans Lake is helpful in understanding the depositional environment in which we found the Archaic period canoes. The quartz sand deposits, which are 1.2–1.5 m thick, are most extensive around the margins of the lake, while the recent gyttja dominates the center. Study of cores from the lake suggests that windblown sand became incorporated in the lake during episodes of low water levels (Holly 1976:54–57). This happened during two periods—once before 5000 B.P. and again between 3000 and 4000 B.P. Holly (1976:48) concludes that the sand's distribution in the lake is "probably the result of winnowing by wave action and indicates old shore line deposits which were created at lower lake levels."

Depositional environments for other Archaic period canoes vary from the primarily sandy, mineral soils like those at Newnans Lake to thick deposits of peat,
Figure 4. Plan of the Newnans Lake canoe site (8AL4792), showing the distribution of the Archaic period canoes along with canoes dated to more recent time periods and undated canoes. See Table 1 for data on numbered canoes.

Like those encountered at the Davis Florahome (8PU1324), Harney Flats (8HI2136), IMC (8PO6495), and Stricklin Peat (8CL738) canoe finds. The contrasting depositional environments observed for the Archaic period canoes are probably related to very local or regional phenomena that affected deposition of sands and growth of peat and muck strata.

Form

All of the canoes examined during our study were made of fire-hollowed logs, as evidenced by their charred interior deck. In two cases charring was noted on the ends and exterior surface as well, suggesting fire might have been used in shaping the hull of the boats. Tool marks were not observed on
any of the canoes, although both stone and shell implements probably were used to help shape the logs into canoes. Ethnohistoric accounts of canoe-making using a charring and scraping method are available, including engravings by de Bry showing sixteenth-century manufacture (see Swanton 1946:589–595).

Bullen and Brooks (1968:106–107) proposed a typology of three canoe types, based on the large collection amassed by the Florida Museum of Natural History. Their “type c” canoe was the only precontact type, described as a true “dugout” made by fire-hollowing, with blunt, overhanging ends. Newsom and Purdy (1990:170; also see Purdy 1991:269–276) revised this typology, suggesting that three precontact period, and at least three postcontact period, styles can be recognized. Their first group, supposed to represent the earliest style, is described as roughly hewn, blunt-ended, averaging 3.6 m in length, with stern and bow indistinguishable (Newsom and Purdy 1990:169–170). The second group is described as more finely finished, with ends that bevel slightly upwards, and with an average length of 5.6 m (Newsom and Purdy 1990:169–170). The third type has distinctive overhanging platform ends (Newsom and Purdy 1990:170–171).

The Newnans Lake canoes provide an interesting test of Newsom and Purdy’s typology. Of the 41 Archaic period canoes, 31 most closely resembled the “Type 2” canoes described by Newsom and Purdy (1990:169–170) with slightly upward-sloping ends (Figure 5). Several of the canoes (i.e., 1, 73, 76, and 77) have slight overhanging platform bows, somewhat suggestive of the “Type 3” canoes (Newsom and Purdy 1990:170–171). When compared to examples with distinctive platform bows, however, it becomes clear that the Newnans Lake examples are not “Type 3” canoes, and are instead classifiable as “Type 2.” Six of the canoes were too poorly preserved to consider form. Canoe 19 was difficult to classify; it has a blunt stern, but the bow has two lateral cuts, giving the end an overall V-shape.

One of the most distinctive morphological features present on the Newnans Lake canoes is a low partition or “thwart” found in the middle and/or end of 19 canoes (Figure 6). These were between 2.5 and 10 cm in height and averaged 11 cm in width. Eight of the canoes had thwarts in the middle, four

Figure 5. Comparison of canoe end morphology.
The purpose of these thwarts is unclear, although several researchers have suggested that they are “foot mounts” used when poling through shallow water (Hartmann 1996:83–84; McGee 2001:83–84). Others have suggested that the thwarts or partitions may be relics of manufacturing (Memory, Ruhl, and Swann 2001). Seminole canoe makers employ a large central thwart, which is later removed, to prevent warping as they hollow out their canoes (Neill 1953:79–80). A central thwart, like that used by Seminole canoe makers, would help in manufacturing, but the end thwarts seem less useful since the thick ends of the precontact canoes are unlikely to warp. In either case, thwarts appear to be one of the few chronologically sensitive features known for the precontact Florida canoes.

The Newnans Lake canoes provide an excellent representation of Archaic period canoe dimensions (Figure 7). Nineteen of the Archaic canoes had both ends present and provided data about canoe length (Table 1). The canoes ranged between 4.57 and 8.60 m in length, averaging 7.06 m in length. Canoe 22, which was missing one end, measured 9.50 m and was the longest canoe found. In general the Archaic period canoes from Newnans Lake are consistently longer than the “Type 1” and “Type 2” canoes discussed by Newsom and Purdy (1990:170). Data on maximum width, or beam, also was gathered for the Newnans Lake Archaic period canoes (Table 1). The canoes averaged .58 m in width, which is almost .20 m wider than the average reported by Newsom and Purdy (1990:170). This consistently wider beam is probably due to the degraded condition of the mid-sections of most of the canoes examined. In many cases the sides of the canoes had collapsed inward or outward, making it difficult to measure the original beam.

Wood Analysis

Microscopic wood analysis was conducted by making a number of thin sections from the sampled canoes (Ruhl 2001). Each sample was identified through three-dimensional anatomy (radial, tangential, and transverse sections) with reference to
comparative wood specimens and wood slides housed at the Florida Museum of Natural History herbarium (FLAS) and standard anatomical keys (e.g., Panshin and deZeeuw 1980; Record and Hess 1942–1948; Urling and Smith 1953) (Table 1).

All the samples are non-porous woods (lacking vessels) with radial rows of tracheids, indicating that they are coniferous (softwoods) rather than angiosperms (hardwoods). Resin canals were observed in most of the samples; a few, however, exhibited scanty or no resin canals in the growth rings. Due to poor preservation, some of the wood samples (n = 6) could only be identified as conifers and are listed as Gymnospermae in Table 1. Thirty-one of the Archaic period canoes were identified as yellow or southern hard pine (*Pinus* spp.). Two were tentatively identified as another species of pine, due to the lack of diagnostic dentate ray tracheids (Ruhl 2001). One of the more recent Late Archaic canoes (15), dating to 2330–2720 B.P., was identified as cypress (*Taxodium distichum*). This pattern is consistent with prior studies of wood types used in making precontact Florida canoes.

Data in the canoe files maintained by the Florida Bureau of Archaeological Research indicate three (6 percent) of 47 canoes evaluated, dating between 320 and 6050 B.P., were microscopically identified as southern hard pine (*Pinus* spp.). Newsom and Purdy (1990:178) suggested that canoes dating to the postcontact period were more often made of cypress. Despite this temporal trend, the oldest Florida canoe, DeLeon Springs 2 (6050 ± 60 B.P., cal. 2 sigma 6740–7020 B.P.), was made of cypress as was Newnans Lake Canoe 15.

**Radiocarbon Dates**

Standard radiocarbon assays were prepared for 55 of the Newnans Lake canoes by Beta Analytic, Inc.
Table 1. Data on Archaic Period Canoes from Newnans Lake (8AL4792).

<table>
<thead>
<tr>
<th>Canoe No.</th>
<th>Beta No.</th>
<th>Conv. Age B.P.</th>
<th>Cal. 2 Sigma B.P.</th>
<th>Both Ends</th>
<th>Thwarts</th>
<th>Wood Taxon</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Type</th>
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<td>61</td>
<td>146307</td>
<td>2370 ± 70</td>
<td>2190-2720</td>
<td>X</td>
<td>E/M</td>
<td>Gymnospermae</td>
<td>7.31</td>
<td>.95</td>
<td>2/3</td>
</tr>
<tr>
<td>12</td>
<td>146280</td>
<td>2400 ± 60</td>
<td>2330-2720</td>
<td>X</td>
<td>E/M</td>
<td>Taxodium distichum</td>
<td>6.5</td>
<td>.95</td>
<td>2/3</td>
</tr>
<tr>
<td>1</td>
<td>146266</td>
<td>2570 ± 50</td>
<td>2490-2770</td>
<td>X</td>
<td>E/M</td>
<td>Pinus spp.</td>
<td>9.41</td>
<td>.95</td>
<td>2/3</td>
</tr>
<tr>
<td>11</td>
<td>146276</td>
<td>2610 ± 60</td>
<td>2510-2795</td>
<td>X</td>
<td>E/M</td>
<td>Pinus spp.</td>
<td>9.41</td>
<td>.95</td>
<td>2/3</td>
</tr>
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<td>22</td>
<td>146287</td>
<td>3090 ± 60</td>
<td>3150-3440</td>
<td>X</td>
<td>E/M</td>
<td>Pinus spp.</td>
<td>8.41</td>
<td>.95</td>
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<td>E/M</td>
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<td>.95</td>
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<td>E/M</td>
<td>Pinus spp.</td>
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<td>.95</td>
<td>2/3</td>
</tr>
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<td>25</td>
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<td>3900-4210</td>
<td>X E/M</td>
<td>E/M</td>
<td>Pinus spp.</td>
<td>8.41</td>
<td>.95</td>
<td>2/3</td>
</tr>
<tr>
<td>49</td>
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<td>3980-4430</td>
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<td>E/M</td>
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<td>4090-4500</td>
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<td>4170-4800</td>
<td>X E/M</td>
<td>E/M</td>
<td>Pinus spp.</td>
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<td>4260-5290</td>
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<td>E/M</td>
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<td>Pinus spp.</td>
<td>8.41</td>
<td>.95</td>
<td>2/3</td>
</tr>
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</table>

Calibrations using INTCAL98, see Stuiver and van der Plicht (1998), Stuiver et al. (1998), and Talma and Vogel (1993).

E = end, M = middle, E/M = end and middle.

Dates corrected for Δ13C/12C ratio, ratio estimated for all others.

of Miami. The wood samples used in species identification were also used in radiocarbon dating. One date, at 40 ± 50 B.P., was anomalous, and is not used in our analysis. Thirty canoes dated between 500 and 1300 B.P., four dated between 2300 and 2700 B.P., and 37 dated between 3000 and 5000 B.P. The latter two groups form the basis of the current study. The initial 53 dates did not include correction for Δ13C/12C fractionation, but this has been estimated to produce the conventional ages reported in Table 1. The two additional radiocarbon determinations, made in October 2001, included a measured Δ13C/12C ratio that varied only slightly from the accepted standard for wood (−25 %o).

These dates suggest placement within the Late Archaic period, which according to Milanch (1994:85) ranges between 2500–5000 B.P. in Florida. Bense (1994:85, 105–107) suggests
3000–6000 B.P. for the Late Archaic in the broader Southeast. In terms of regional chronology in Florida, the canoes span the transition between the pre-pottery Mount Taylor period (6000–4000 B.P.) and the early fiber-tempered Orange period (4000–2500 B.P.). The Mount Taylor and Orange periods are best known from shell mounds in the St. Johns River area, but these chronological units may be applicable to the cultures present around Newnans Lake as well (Clausen 1964:18–19; McGee and Wheeler 1994:340–342).

**Associated Artifacts**

Artifacts were recovered from the mineral sands associated with 18 of the Archaic period canoes. Screens were not used during excavation, but since most work was done with trowels and bare hands, it was possible to recognize small artifacts in and around the canoes. Artifacts include 59 complete and fragmentary chert flakes, five utilized flakes or flake tools, one eroded sand-tempered plain sherd, and two Orange Incised fiber-tempered sherds. Fragments of three wooden artifacts, including what may be a portion of a canoe paddle, were found under two of the canoes. Chert flakes, chert bifaces, worked chert boulders, sherds, and two partially complete ceramic vessels were recovered as surface finds near, but not in direct association, with the canoes. Other wooden artifacts found in the study area include a handmade, postcontact period canoe paddle and an array of poles that may represent a fish weir (Memory, Ruhl, and Swann 2001). All the artifacts encountered with the canoes are thought to represent materials from nearby sites, which became buried in the lake sands by the same processes that buried the canoes. There is no indication that the artifacts represent items left in the canoes.

**Discussion**

Wooden dugout canoes are known in large numbers from Florida and are represented in many other states in the Southeast and Midwest as well (Brose and Greber 1982; Hartmann 1996). Despite the large sample size, many of the known canoes are fragmentary, poorly documented, or undated; our ability to make comparisons and to draw conclusions is correspondingly limited. This is especially true for early canoes, as demonstrated by Table 2.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Name</th>
<th>Age B.P.</th>
<th>Measured Age B.P.</th>
<th>Wood Taxon</th>
<th>Wood Taxon 2 Sigma</th>
<th>Type</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Age B.P.</th>
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<td>8V020</td>
<td>Delcoton Springs 2</td>
<td>6400 ± 50</td>
<td>6400–6500</td>
<td>Pinus spp</td>
<td>3.40 ± 0.25</td>
<td>Pinus spp</td>
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<tr>
<td>8V019</td>
<td>Delcoton Springs 3</td>
<td>6150 ± 40</td>
<td>6150–6400</td>
<td>Pinus spp</td>
<td>2.70 ± 0.15</td>
<td>Pinus spp</td>
<td>2</td>
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<tr>
<td>8V018</td>
<td>Delcoton Springs 1</td>
<td>6000 ± 50</td>
<td>6000–6200</td>
<td>Pinus spp</td>
<td>3.50 ± 0.25</td>
<td>Pinus spp</td>
<td>3</td>
<td></td>
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<tr>
<td>8SP1302</td>
<td>Lake Gollan 3</td>
<td>5900 ± 50</td>
<td>5900–6400</td>
<td>Pinus spp</td>
<td>2.60 ± 0.15</td>
<td>Pinus spp</td>
<td>4</td>
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<td>8V0134</td>
<td>Harney flats</td>
<td>5900 ± 50</td>
<td>5900–6400</td>
<td>Pinus spp</td>
<td>3.30 ± 0.25</td>
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<tr>
<td>8SP1319</td>
<td>Davis-Porthmae-4</td>
<td>5700 ± 50</td>
<td>5700–6200</td>
<td>Pinus spp</td>
<td>2.50 ± 0.15</td>
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<td>5</td>
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<tr>
<td>8CL178</td>
<td>Lake Monroe</td>
<td>5300 ± 50</td>
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<tr>
<td>8CL1411</td>
<td>Lake Lomita 1</td>
<td>5200 ± 50</td>
<td>5200–5700</td>
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<td>2.40 ± 0.15</td>
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<td>4900–5400</td>
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<td>8SP1316</td>
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<td>2.10 ± 0.15</td>
<td>Pinus spp</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All calibrations performed by Beta Analytic, Inc., Miami using INTCAL98 database, see Stuiver and van der Plicht (1998), Stuiver et al. (1998), and Talamis and Vogel (1993).*

*Dates corrected for U/Th ratio, ratio estimated for all others.*
Florida Archaic Period Canoes

Hartmann (1996) used the canoe data amassed by Barbara Purdy and her students to characterize canoes of successive cultural periods, along with other data as available. He concluded that Archaic period canoes were relatively short, averaging 4.11 m in length and .51 m in width, and that the form was typically thick-bottomed with massive, blunt ends (Hartmann 1996:92, 95). This was consistent with Newsom and Purdy’s (1990:170) characterization of “Type 1,” or early style canoes. The Newnans Lake canoes, however, show that canoe form does not correlate well with canoe age. Most of the Archaic period canoes from Newnans Lake have slightly upward-sloping and beveled ends and are quite long, averaging 5.6 m, with one example over 9.5 m. They are indistinguishable from canoes of later periods. Archaic period canoes from central Florida’s Lake Louisa, recorded in 2001, are similar in form and length to the Newnans Lake canoes, suggesting that the shapes and dimensions observed at Newnans Lake are probably representative of Florida’s Archaic period watercraft (see Table 2) (Figure 8). The presence of thwarts on the Newnans Lake, DeLeon Springs 1, and Davis Flrahome 5 canoes further indicates that these Archaic canoes are probably part of a broader, shared tradition of canoe manufacture and use.

The fact that these early canoes are well-made, long, and share features like thwarts is consistent with Kandare’s (1983:90, 92–94) processual model of canoe development in the Southeast. Kandare (1983) envisioned five major stages in the history of development and use of canoes in the Southeast.
The earliest, hypothetical stage involves the use of floating logs by Paleoindian peoples for very short trips, like river crossings. Alternatively, the first people entering the Americas may have been familiar with skin boats, and quickly transferred these forms into wood. It is clear, however, that the “early extension” and “rapid extension” stages in Kandare’s (1983) model must have come quite early in Florida, since the Newnans Lake and other Florida Archaic canoes demonstrate a well-developed canoe-making tradition by at least 5000 B.P., if not even earlier. These stages were probably quite compressed as well, and may have followed one another more rapidly than expressed in Kandare’s (1983) model. This hints at the early importance of watercraft and water travel routes in Florida and the pre-contact Southeast (Hartmann 1996:157–158, 178–180; Kandare 1983:38–44).

Environmental Adaptation and the Newnans Lake Canoes

Development of the earliest New World watercraft may be related to colonization and migration during the Paleoindian and Archaic periods (Hartmann 1996:73–76; Kandare 1983:90, 92). In Florida, however, the oldest known canoes are coeval with the incipient stages of adaptation to freshwater and marine environments. Miller (1992:101; 1998:64–69) suggests that rising sea levels around 6,000 years ago affected local water tables in eastern Florida. This change probably resulted in the genesis of the St. Johns River, the Everglades, and many of the other shallow lakes within the Florida lake district (see Brooks 1974:256). The timing of the development of these freshwater systems correlates well with the appearance of Archaic cultures relying heavily on freshwater resources and with the earliest recorded canoes. Archaeological work at Florida’s Old Enterprise site demonstrates that around 6,000 years ago the Mount Taylor culture was established in the St. Johns River basin, with significant dietary reliance on freshwater fish and shellfish (McGee and Wheeler 1994; Wheeler and McGee 1994a, 1994b). The Orange period component at the same site, dating to ca. 4,000 years ago, demonstrates continuity in this aquatic adaptation (Russo et al. 1992). The St. Johns River sites, like Old Enterprise, often contain shark-tooth tools and marine shell tools, indicating that the coastal zone was being exploited as well. Data from some Florida coastal sites indicate that there were parallel Archaic cultures occupying and exploiting the marine environment at the same time (Murphy 1990; Piatek 1994; Russo 1992, 1993). It is possible that canoes and watercraft existed at even earlier times, but perhaps did not become common until they became an integral tool in collecting and transporting food (Kandare 1983:92–93).

Canoes were part of the Archaic adaptation to aquatic environments, and the fact that this technology existed 4,500–5,000 years ago, as demonstrated by the Newnans Lake canoes, hints that watercraft may have developed even earlier. This is confirmed by the DeLeon Springs 2 canoe, which dates between 6740 and 7020 B.P.—almost two thousand years earlier than the oldest Newnans Lake canoes and coeval with the emergent St. Johns River system. Some researchers have suggested that there may have been even earlier exploitation of coastal environments by Early Archaic and Paleoindian peoples (see Faught 1996:472–475). It is certainly possible that the development of the Mount Taylor culture and the exploitation of interior freshwater resources were not major innovations, but simply an expansion into another aquatic environment. The Archaic canoes from Newnans Lake do not answer that question, but, along with other Archaic period canoes, they demonstrate an early and well-developed canoe-making tradition that is difficult to distinguish from that of later periods.

Function and Use of Archaic Period Canoes

Archaic period canoes are rare in the eastern United States, though several are known from North Carolina and Ohio (Hartmann 1996:81). Brose and Greber (1982) present an interesting analysis of the Ringler dugout canoe, recovered from Savannah Lake in north-central Ohio. The Ringler canoe, made of white oak (Quercus alba), was radiocarbon dated at 3550 ± 70 B.P. (cal. 2 sigma 3640–4075 B.P.). Brose and Greber’s (1982) analysis uses mathematical models of the canoe shape to address questions regarding the craft’s stability and nature of cargo transported. Table 3 compares measurements of five of the better-preserved Newnans Lake canoes with the Ringler canoe. What is most striking is that despite similar lengths, the Newnans Lake and Ringler canoes are quite different. The Ringler canoe is much broader and
Table 3. Comparison of Newnans Lake and Ringler (Ohio) Canoe Dimensions.

<table>
<thead>
<tr>
<th>Canoe</th>
<th>Length (m)</th>
<th>Max. Beam (m)</th>
<th>Max. Height (m)</th>
<th>Max. Depth (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newnans 15</td>
<td>6.50</td>
<td>.55</td>
<td>.25</td>
<td>.15</td>
</tr>
<tr>
<td>Newnans 16</td>
<td>7.68</td>
<td>.60</td>
<td>.30</td>
<td>.15</td>
</tr>
<tr>
<td>Newnans 17</td>
<td>7.02</td>
<td>.66</td>
<td>.29</td>
<td>.20</td>
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<td>Newnans 25</td>
<td>7.22</td>
<td>.72</td>
<td>.30</td>
<td>.20</td>
</tr>
<tr>
<td>Newnans 28</td>
<td>5.15</td>
<td>.59</td>
<td>.30</td>
<td>.20</td>
</tr>
<tr>
<td>Ringler</td>
<td>6.90</td>
<td>1.10</td>
<td>.60</td>
<td>.36</td>
</tr>
</tbody>
</table>

deeper than the Newnans Lake canoes. Interestingly, Brose and Greber (1982:248) also report polished and worn spots on the interior of the canoe that may have resulted from paddlers kneeling on the deck. This feature is absent on all Archaic canoes known from Florida, and canoe paddles recovered throughout the state suggest that these long, narrow-bladed implements may have been used better as poles or for paddling while standing (also see McGee 2001). Poles are associated with several Florida dugout canoes, including Archaic examples.

Brose and Greber (1982:251–253) calculate that the Ringler canoe would have been unstable without a minimum load of 680 kg, including two or three passengers/canoists. This load is the weight at which the minimum allowable freeboard of 10 cm is reached. If more weight is added beyond 680 kg, less than 10 cm of the craft's sides will extend above the waterline, increasing the chances that the canoe will sink. If less weight is loaded into the canoe, the craft will become increasing unstable. Unfortunately, the Newnans Lake canoes are very fragmentary, making similar calculations of volume, mass, and cargo area highly speculative. It is clear, however, that given the shallow depth and narrow beam of the Newnans Lake canoes, they would have provided less available freeboard and reduced cargo capacity, as outlined by Riviere (1969:10–13).

Brose and Greber (1982:256–257) recognize that the Ringler canoe would have been unstable without a minimum load of 680 kg, including two or three passengers/canoists. This load is the weight at which the minimum allowable freeboard of 10 cm is reached. If more weight is added beyond 680 kg, less than 10 cm of the craft’s sides will extend above the waterline, increasing the chances that the canoe will sink. If less weight is loaded into the canoe, the craft will become increasing unstable. Unfortunately, the Newnans Lake canoes are very fragmentary, making similar calculations of volume, mass, and cargo area highly speculative. It is clear, however, that given the shallow depth and narrow beam of the Newnans Lake canoes, they would have provided less available freeboard and reduced cargo capacity, as outlined by Riviere (1969:10–13).

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Further Cultural Implications of the Newnans Lake Canoes

Canoeist and educator Charles Blanchard (1999:40) explores Native American use of canoes in Florida waters, recognizing that the Indian canoe was a tool that served as “pack animal and work bench.” Blanchard’s (1999:40–41) metaphor illuminates the complex relationship that existed between Indian canoeist and canoe, complementing the analysis conducted by Brose and Greber (1982). The construction of canoes, canoe use, routes utilized, the timing of trips, cargos carried, items collected, and the siting of camps, landings, and settlements all are elements of an efficient adaptation. Dobyns (1983:239–240) also recognizes the significance and efficiency of the canoe among native Florida cultures, citing one sixteenth century Spanish account that recommends the systematic destruction of Indian canoes as the best means to disrupt native society (see Bartolomé de Argüelles’s account in Quinn 1979:88–92). Dobyns (1983:242–244) further notes that anthropologists tend to overlook the role of the canoe in the emergence of cultural complexity, and he suggests that...
canoe efficiency in moving subsistence, exchange, and tribute items aided in the development of large villages and the need for communal storage among contact period groups like the Timucua. The views of Blanchard (1999) and Dobyns (1983) help in understanding why so many canoes were found at Newnans Lake; like the ubiquitous stone tools and ceramics that are readily identified with native Florida cultures, the canoe was a tool of central importance in an aquatic-oriented culture. Luer (1989:124) further suggests that the canoe was not only significant for transport and subsistence activities, but may have held an archetypal role in native Florida society and cosmology.

The extensive systems of natural waterways in Florida support Dobyns’s (1983:242–244) recognition of the significance of water transport in native Florida. Brenner et al. (1990:364–365) report that there are over 7,800 lakes in Florida, covering about 6 percent of the total landmass. Most of these are small, though five have surface areas greater than 100 km², including Lake Okeechobee, Lake George, Lake Kissimmee, Lake Apopka, and Lake Istokpoga. Likewise, Nordlie (1990:392–392) indicates that there are over 1,700 rivers in Florida, with most of the major ones linking interior areas to the Gulf of Mexico or Atlantic Ocean. Added to these in southern Florida are the Everglades and the many, now canalized, streams that drained this freshwater marsh to coastal lagoons and bays. Wheeler (1995:278, Figure 1) argued that these natural waterways, along with canoe trails identified on satellite photographs and early maps, were part of an extensive, aquatically based travel and communication system.

The central position of canoes and water travel in the native cultures of Florida ultimately contributed to the construction of long-distance canoe canals that linked settlements, overland paths, canoe trails, and natural waterways (Luer 1989; Luer and Wheeler 1997; Wheeler 1995). At least seven canoe canals have been identified in southern and northwestern Florida, ranging between 1.26 km and 6.3 km in length (Wheeler 1998:Table 1). Average widths vary from 3 to 9 m, with average depths of .3 to 2.4 m. Application of engineering and hydraulic principles demonstrates that these canals were sophisticated structures, whose builders dealt with variation in local topography, effects of ground water and runoff, changes in slope and elevation, and integration with settlement plans and natural watercourses (Luer and Wheeler 1997; Wheeler 1995). The Pine Island Canal, for example, spans 4.2 km across an island that rises from sea level on either side to 4 m above sea level at its highest point. Luer and Wheeler (1997:124–125) hypothesize that the canal’s builders used a series of impoundments to control ground water in order to create a water-filled, functioning canal. Attempts to date the canals have met with difficulty, though the Ortona canals near Lake Okeechobee and the Caloosahatchee River have been radiocarbon dated between A.D. 110–380 and A.D. 600–890 (Carr et al. 2002:16, 21). None of the known canals is thought to date to the Archaic period. However, the early canoe industry in evidence at Newnans Lake suggests that the traditions that led to such engineering were already in place during the Archaic.

Conclusion

Fifty-five dugout canoes from Newnans Lake were studied for attributes of form, age, wood type, and spatial distribution. Forty-one of these canoes dated to the Late Archaic period, producing radiocarbon dates between 2300 and 5000 B.P. Temporally the canoes straddle the pre-pottery and early fiber-tempered ceramic horizons of the region. Early canoes were once thought to be short and crudely made, with massive blunt ends. The Newnans Lake canoes demonstrate that Archaic period peoples of north-central Florida participated in a widely shared and well-developed canoe-making tradition that persisted well into the period of European contact. Pine was the most common wood chosen for making canoes, into the protohistoric period. The Archaic canoes from Newnans Lake average 5.6 m in length, longer than many canoes from more recent time periods. One fragmentary example was 9.5 m long, perhaps the longest precontact dugout in the Southeast (cf. Hartmann 1996:153). The ends of the Newnans Lake canoes are upward sloping and tapered, and some have a slight overhanging platform—typical end shapes formerly thought to be associated only with more recent canoes. Thwarts were present in the ends and/or mid-sections of 19 of the Archaic canoes, a feature noted for at least two other Archaic period watercraft from elsewhere in Florida. The shallow depth and narrow beam of the Newnans Lake craft suggest use by experienced canoeists who designed their
canoes for speed and light loads, sacrificing stability. Other Florida Archaic canoes have similar shapes and sizes, suggesting that a well-developed canoe-making tradition was shared throughout much of the Florida peninsula by ca. 5,000 to 6,000 years ago. This correlates with the emergence of freshwater resources in the shallow lakes of the peninsula lake district, the St. Johns River, and the Florida Everglades. The reliance on canoes for communication and transport likely contributed to the development of an extensive system of canoe trails, landings, overland paths, fords, and canoe canals.

Acknowledgments. We would like to thank Steve Everett and his Eastside High School students for their assistance in locating canoes and for providing access through the Gum Root Swamp property that they help manage. Barbara Purdy deserves credit for her recognition of Florida’s canoes as an unusual and important cultural resource, and for introducing a number of the authors and others to the study of canoes. Thanks also go to Christine Newman and Bill Stanton, who assisted with survey and excavation. Volunteers who helped locate and excavate canoes also deserve our thanks. George Luer provided valuable review comments, as did Glen Doran and two anonymous reviewers. Their thoughtful comments helped improve the paper. Jorge Zamantillo and Emma Heald of the Historical Museum of Southern Florida, Miami kindly provided the Spanish translation of our abstract.

References Cited

Bense, J. A.
Blanchard, C.
Brenner, M. M., M. W. Binford, and E. S. Devere
Brooks, H. K.
Brose, D. S., and I. Greber
Bullen, R. P.

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Lake Monroe, Volusia County, Florida: Methodology and Results. The Florida Anthropologist 47:333–349.

Mahon, J. K.

Matus, R.

Memory, M., D. L. Ruhl, and B. Swann

Memory, M., B. Swann, D. Ruhl, B. Stanton, and B.E. Mattick
2001 National Register of Historic Places Registration Form for Lake Pithlachocco Canoe Site (8AL4792). On file, Florida Division of Historical Resources, Tallahassee.

Milanich, J. T.

Miller, J. J.


Murphy, L. E.
1990 8SL17: Natural Site-Formation Processes of a Multiple Component Underwater Site in Florida. Professional Paper No. 39. Southwest Cultural Resources Center, National Park Service, Santa Fe.

Neill, W. T.


Nordlie, F. G.

Panshin, A. J., and C. deZeeuw

Piatek, B. J.

Purdy, B. A.


Quinn, D. B. (editor)

Read, W. A.
1934 Florida Place-Names of Indian Origin and Seminole Personal Names. University Studies No. 11. Louisiana State University, Baton Rouge.

Record, S. J., and R. W. Hess

Riviere, B.

Ruhl, D. L.

Russo, M.


Russo, M., B. A. Purdy, L. A. Newsom, and R. M. McGee

Sassaman, K. E.

Simpson, J. C.

Stelmok, J., and R. Thurlow

Stuiver, M., and H. van der Plicht


United States Geological Survey

Urland, G. P., and R. B. Smith

Watts, W. A.

Wheeler, R. J.


Wheeler, R. J., and R. M. McGee

Willis, R. F.

Notes

1. Maps and documents of the early to mid-nineteenth century indicate that Newnans Lake was formerly known as Pithlachocco Lake, which Simpson (1956:93) interprets as a Creek word meaning boat or canoe house. Likewise, Read (1934:30) indicates that Pithlachocco is derived from the Seminole words pilo (boat) and chuko (house), with a meaning of “ship” or “boat house.” Other interpretations have suggested that Pithlachocco means “place of long boats” (Gallagher and Flowers 2000). The discovery of the canoes prompted a local debate over which name should be used (Matus 2001). The current name refers to Colonel Daniel Newnan, who led a group of Georgia militia against the Seminoles in September and October 1812 (Mahon 1985:21). This article follows the usage of the name “Newnans Lake,” as used by the United States Geological Survey (1981).

2. These belong to a group of southeastern and eastern United States pines that cannot be identified to species on the basis of wood structure. These include longleaf pine (P. palustris), shortleaf pine (P. echinata), loblolly pine (P. taeda), and others.

3. Initially the four canoes dating between 2300 and 2700 B.P. were placed in a different group, straddling the most recent and pre-3000 B.P. canoes. Further consideration of the date for the end of the Late Archaic in the Southeast and the Orange period in eastern and central Florida, circa 2500 B.P., led to their inclusion with the other Archaic period canoes.

4. The University of Florida Canoe Files, documenting most of the canoes reported to and curated by the Florida Museum of Natural History, as well as canoes reported during droughts in 1976–1977, 1981, and 1990, were transferred to the Bureau of Archaeological Research in 1995. All canoe data were entered into the Florida Master Site File in 2001, including canoes recorded during the drought of 1999–2001. One hundred and ninety-eight sites with 334 canoes have been recorded to date. This includes one very fragmentary canoe recovered from the “east shore” of Newnans Lake in March 1934. This 1.95 m fragment, reported to be cypress, is Catalog No. 68589 in the Florida Museum of Natural History. Newnans Lake levels were lowered during droughts in both 1932 and 1935. Between 1898 and 2001, there have been 18 moderate to significant droughts in Florida (Henry et al. 1994:125–126).

5. Fourteen canoe paddles and paddle fragments from Florida were recorded during this study. Five fairly complete examples include Key Marco (1.35 m), Margate-Blount (1.57 m), Stitt (1.42 m), Newnans Lake (2.29 m), and Goose Lake (1.83 m). The average length of these five paddles is 1.69 m. By contrast, a 3.5-m-long, forked, canoe pole was found in association with the Archaic period Davis Florahome 4 canoe (see Table 2) (McGee 2001). While the paddles tend to be shorter than canoe poles, they are still quite long for use exclusively as paddles. Riviere (1969:31–33) confirms that paddles that are approximately the same length as the canoeist’s standing height can be used comfortably for paddling while standing, sitting, or kneeling.

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